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SAFETY

Operation and Maintenance
Manual Excerpt

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CATERPILLAR®

CATERPILLAR®

SEBU7468-06
December 2005

Operation and Maintenance Manual

216, 226, 228, 232, 236, 242, 246, 248, 252 and 262 Skid Steer Loaders

CAB1-Up (Machine)
CMB1-Up (Machine)
CED1-Up (Machine)
FDG1-Up (Machine)
4NZ1-Up (Machine)
4YZ1-Up (Machine)
5FZ1-Up (Machine)
5SZ1-Up (Machine)
6BZ1-Up (Machine)
6LZ1-Up (Machine)

Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the “Safety Alert Symbol” and followed by a “Signal Word” such as “DANGER”, “WARNING” or “CAUTION”. The Safety Alert “WARNING” label is shown below.

⚠ WARNING

The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

The message that appears under the warning explains the hazard and can be either written or pictorially presented.

Operations that may cause product damage are identified by “NOTICE” labels on the product and in this publication.

Caterpillar cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive. If a tool, procedure, work method or operating technique that is not specifically recommended by Caterpillar is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that the product will not be damaged or be made unsafe by the operation, lubrication, maintenance or repair procedures that you choose.

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Caterpillar dealers have the most current information available.

⚠ WARNING

When replacement parts are required for this product Caterpillar recommends using Caterpillar replacement parts or parts with equivalent specifications including, but not limited to, physical dimensions, type, strength and material.

Failure to heed this warning can lead to premature failures, product damage, personal injury or death.

Safety Section

i02108092

Safety Messages

SMCS Code: 7000; 7405

There are several specific safety signs on this machine. The exact location of the hazards and the description of the hazards are reviewed in this section. Please become familiarized with all safety signs.

Make sure that all of the safety signs are legible. Clean the safety signs or replace the safety signs if you cannot read the words. Replace the illustrations if the illustrations are not legible. When you clean the safety signs, use a cloth, water and soap. Do not use solvent, gasoline, or other harsh chemicals to clean the safety signs. Solvents, gasoline, or harsh chemicals could loosen the adhesive that secures the safety sign. Loose adhesive will allow the safety sign to fall.

Replace any safety sign that is damaged, or missing. If a safety sign is attached to a part that is replaced, install a safety sign on the replacement part. AnyCaterpillar dealer can provide new safety signs.

Do Not Operate

Illustration 2 g00536638

This warning label is positioned inside the cab.

⚠ WARNING

Read and understand the instructions and warnings in the operation and maintenance manuals. Contact any Caterpillar dealer for replacement manuals. Proper care is your responsibility.

Be alert! Know work conditions. Note and avoid all hazards and obstructions. Keep by-standers away when operating.

Fasten seat belt and lower armrest.

Make certain all controls are in neutral position and start engine.

Disengage parking brake.

Machine controls are active.

Failure to follow the instructions or heed the warnings could result injury or death.

Stay Inside Operator Station

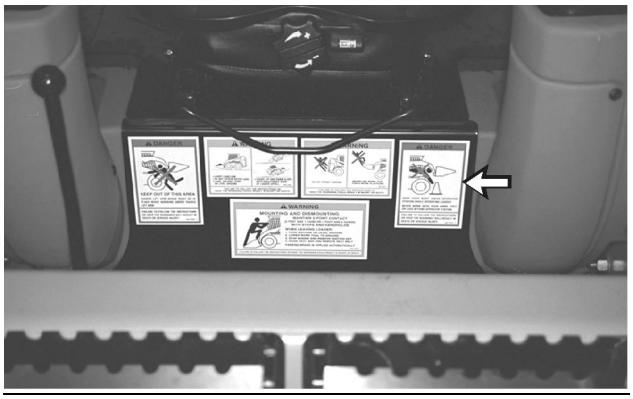


Illustration 3 g00540797

This danger sign (1) is located below the operator seat.

⚠ DANGER

Keep your body inside operator station while operating loader.

Never work with your arms, feet or legs beyond operator station.

Failure to follow the instructions or heed the warnings will result in death or serious injury.

Loader Crushing

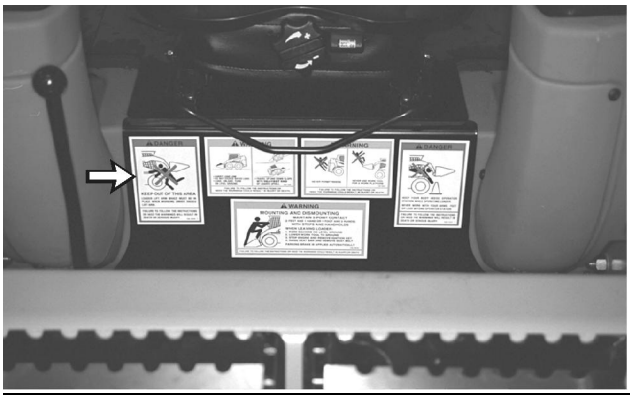


Illustration 4 g00540792

This danger sign is located below the operator seat.

⚠ DANGER

Keep out of this area

Loader lift arm brace must be in place when working under raised lift arm.

Failure to follow the instructions or heed the warnings will result in death or serious injury.

Machine Operation in Cold Weather

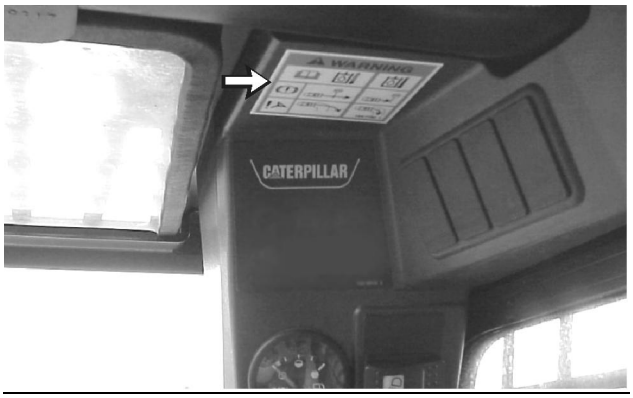
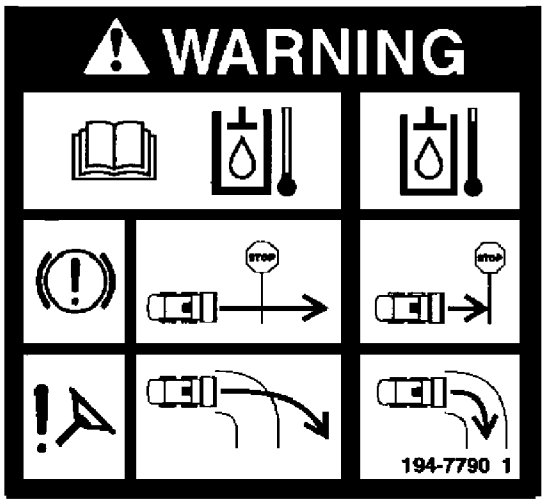


Illustration 5 g00791713

This warning label is located inside the cab.



g00757507

WARNING

The braking and steering system of this machine react differently when the hydraulic oil is cold. Operating the machine with cold hydraulic oil requires extra stopping and turning clearances. Failure to follow the instructions or heed the warnings could result in injury or death.

Refer to Operation and Maintenance Manual, “Engine Starting With Glow Plugs” for information on machine preparation for cold weather.

Pressurized System

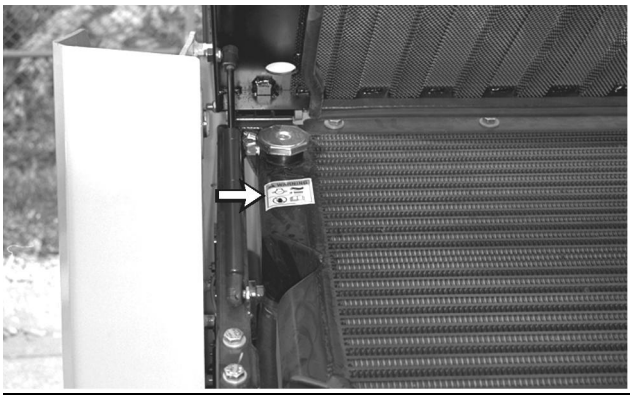


Illustration 6 g00536624

This warning is positioned below the radiator cap.

WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

Batteries

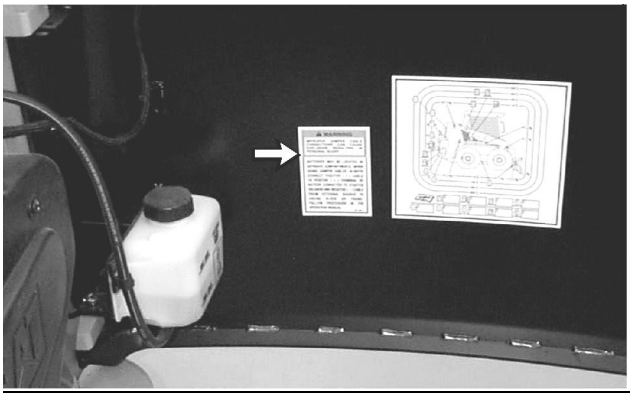


Illustration 7 g00536625

This warning is positioned on the inside of the engine access door.

WARNING

Improper jumper cable connections can cause explosion resulting in personal injury. Batteries may be located in separate compartments, always connect positive (+) cable to positive (+) terminal of battery connected to starter solenoid and negative (−) cable from external source to engine block or frame.

Battery

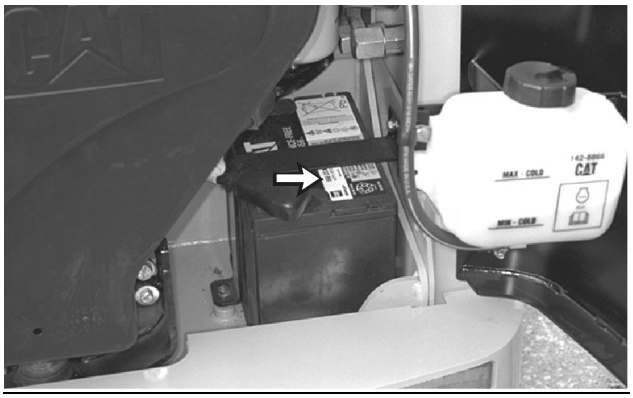


Illustration 8 g00536640

This label is located on the battery.

WARNING

DANGER/POISON

Shield eyes, Explosive gases. Can cause blindness or injury.

No sparks, flames or smoking.

Sulfuric Acid can cause blindness or severe burns.

FLUSH EYES IMMEDIATELY WITH WATER. Get medical help fast.

Keep out of reach of children. Contains sulfuric acid. For medical emergency in USA or Canada contact: 800-458-5924, other countries contact: 303-893-1322.

Lift Arm Brace for the 216, 226, 228, 236, 246 and 248 Machines

Illustration 9 g00589497

This warning is positioned on the lift arm brace.

WARNING

Loader lift arm brace must be in place when working under raised lift arms.

Failure to follow the instructions or heed the warnings could result in injury or death.

Use the following steps to install the lift arm brace:

1. Remove the work tool. Park the machine on level ground. Lower lift arms to the ground. Stop the engine and exit the machine.

2. Remove the retaining pin and lower the brace onto the lift cylinder.

3. Mount the machine. Secure the seat belt and lower the armrest. Start the engine.

4. Raise the lift arms until the brace falls onto the cylinder rod. Slowly lower the lift arms until the brace stops movement.

5. Stop the engine. Exit the machine. Secure the retaining pin through the brace below the cylinder rod.

Use the following steps to remove the lift arm brace:

1. Remove the retaining pin from the brace and install the pin in the holding block.

2. Detach and swing the pivot lever clockwise onto the retaining pin.

3. Mount the machine. Secure the seat belt and lower the armrest. Start the engine.

4. Slowly raise the lift arms until the lever engages the retaining pin.

5. Slowly lower the lift arms to the ground. Stop the engine. Exit the machine.

6. Raise and secure the brace to the lift arm with the retaining pin.

Refer to Operation and Maintenance Manual, “Loader Lift Arm Brace Operation” for additional information.

Lift Arm Brace for the 232, 242, 252 and 262 Machines

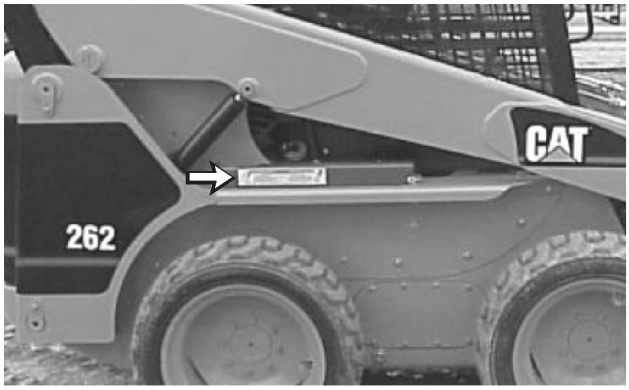


Illustration 10 g00771460

This warning is positioned on the lift arm brace.

⚠ WARNING

Loader lift arm brace must be in place when working under raised lift arms.

Failure to follow the instructions or heed the warnings could result in injury or death.

Use the following steps to install the lift arm brace:

1. Remove the work tool. Park the machine on level ground. Raise the lift arms to maximum height.

2. Remain in the seat. The seat belt must be fastened and the armrest must be in the lowered position. Remain in the seat until the brace is installed.

3. A second person must remove the brace from the storage position by removing the retaining pins.

4. The second person should then install the brace over the rod of one of the lift cylinders.

5. Lower the loader lift arms slowly until the brace is held tightly between the rod and the cylinder.

6. Secure the two retaining pins through the brace below the rod.

Use the following steps to remove the lift arm brace:

1. Mount the machine. Fasten the seat belt. Lower the armrest and remain in the seat until the brace is removed.

2. Slowly raise the lift arms until the brace is free.

3. A second person must remove the retaining pins and the brace from the rod.

4. Slowly lower the lift arms to the ground.

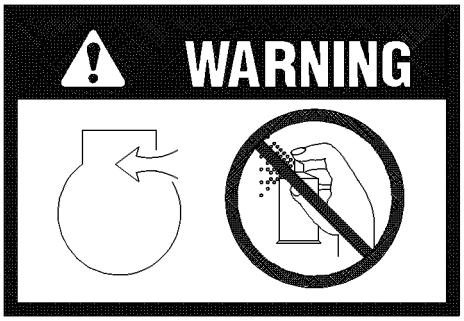
5. The second person should return the brace to the storage location. Attach the brace with the retaining pins.

Refer to Operation and Maintenance Manual, “Loader Lift Arm Brace Operation” for additional information.

Aerosol Starting Aid

Illustration 11 g00580397

This warning is located on top of the fuel pump housing.



g00103679

⚠ WARNING

Do not use aerosol types of starting aids such as ether. Such use could result in an explosion and personal injury.

Work Tool Coupler

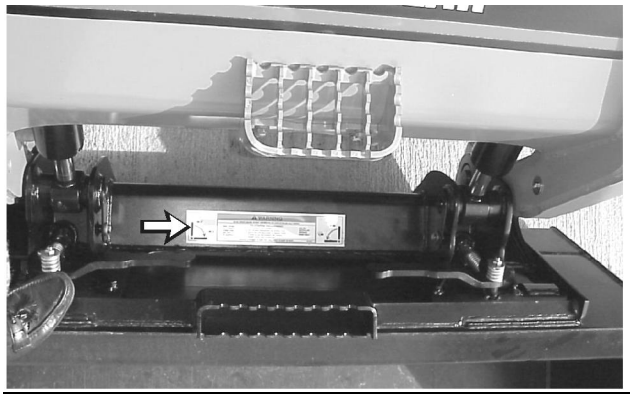


Illustration 12 g00586150

This warning is located on the coupler assembly.

⚠ WARNING

Do not operate machine without confirmation that coupler pins are fully engaged

Make certain all hydraulic connections are tight (if equipped)

Use only Caterpillar approved work tools

Improper attachment of work tool could result in injury or death

Tilt the work tool downward.

Put down pressure on the work tool.

Move the machine backward. Ensure that the work tool has not separated from the coupler assembly.

Work Tool Coupler

Illustration 13 g00864276

This warning is located inside the cab near the hydraulic quick coupler control.

⚠ WARNING

Improper Attachment of the Work Tool could result in injury or death.

Do not operate the machine without confirmation that the coupler pins are fully engaged. Follow the operating procedures in the Operation and Maintenance Manual.

Tilt the work tool downward.

Put down pressure on the work tool.

Move the machine backward. Ensure that the work tool has not separated from the coupler assembly.

ROPS/FOPS STRUCTURE

Illustration 14 g00540819

This warning is located inside the cab on the upper left side.

WARNING

Structural damage, an overturn, modification, alteration, or improper repair can impair this structure's protection capability thereby voiding this certification. Do not weld on or drill holes in the structure. Consult a Caterpillar dealer to determine this structure's limitations without voiding its certification.

Cab Support

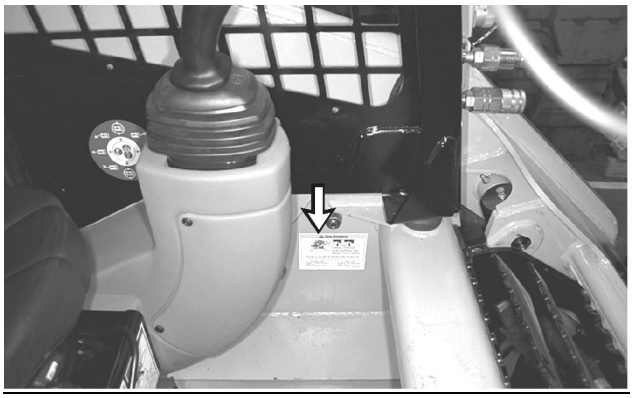


Illustration 15 g00540861

This warning is located inside the cab on the left side.

WARNING

Do not go beneath cab unless cab is empty and support lever is engaged.

Failure to follow the instructions or heed the warnings could result in injury or death.

Cab Support

Illustration 16 g00542201

This warning is located on the left side of the machine.

WARNING

Do not go beneath cab unless cab is empty and support lever is engaged.

Failure to follow the instructions or heed the warnings could result in injury or death.

Carrying a Load

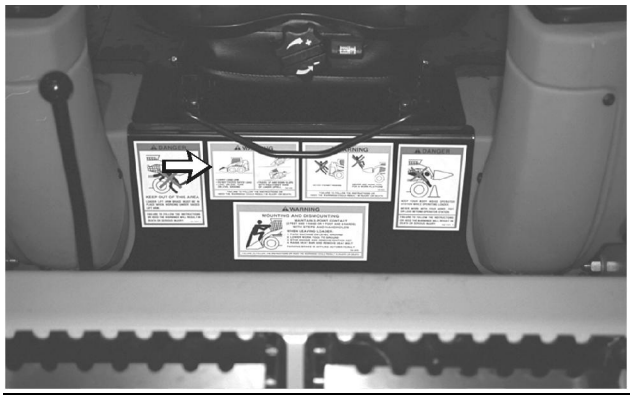


Illustration 17 g00540824

This warning is located below the operator seat.

⚠ WARNING

Carry load low.

Do not exceed rated load.

Load, unload, turn on level ground.

Travel up and down slope with heaviest end of loader uphill.

Failure to follow the instructions or heed the warnings could result in injury or death.

Never Permit Riders

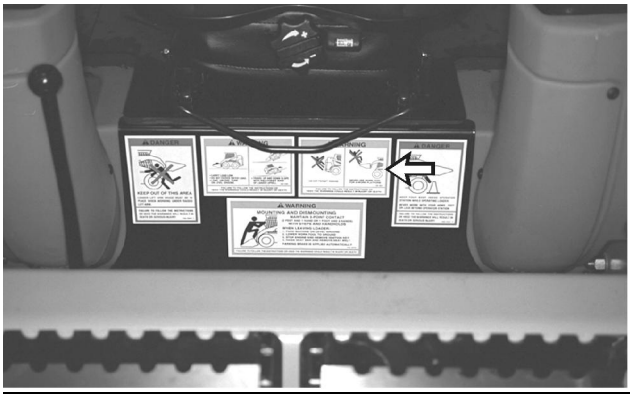


Illustration 18 g00540825

This warning is located below the operator seat.

⚠ WARNING

Never permit riders.

Never use work tool for a work platform.

Failure to follow the instructions or heed the warnings could result in injury or death.

Mounting and Dismounting

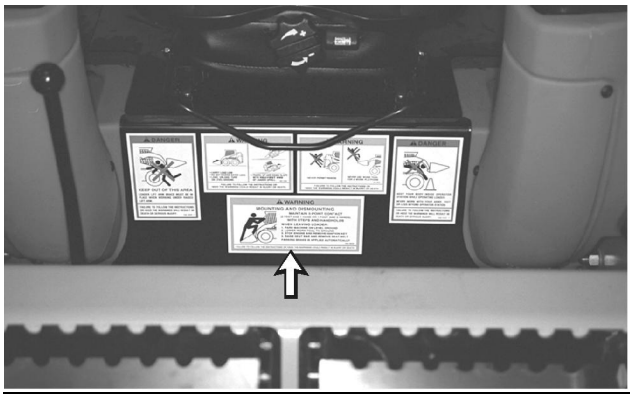


Illustration 19 g00540831

This warning is located below the operator seat.

⚠ WARNING

Mounting and Dismounting

Maintain 3-point contact (2 feet and 1 hand or 1 foot and 2 hands) with steps and handholds

When Leaving Loader:

1. Park machine on level ground

2. Lower work tool to ground

3. Stop engine and remove ignition key

4. Raise arm rest and remove seat belt

Park Brake is applied automatically

Failure to follow the instructions or heed the warnings could result in injury or death

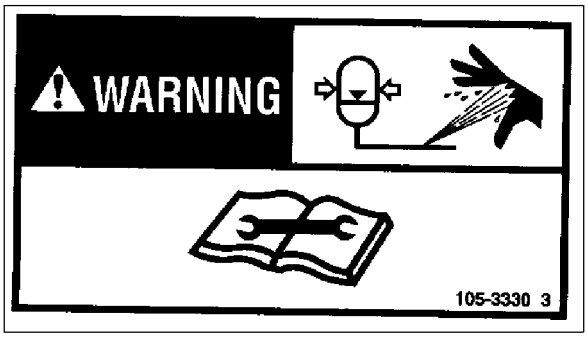
Accumulator

Illustration 20 g00821186

(1) warning (type 1)

(2) warning (type 2)

This warning is located near the accumulator.



g00659138

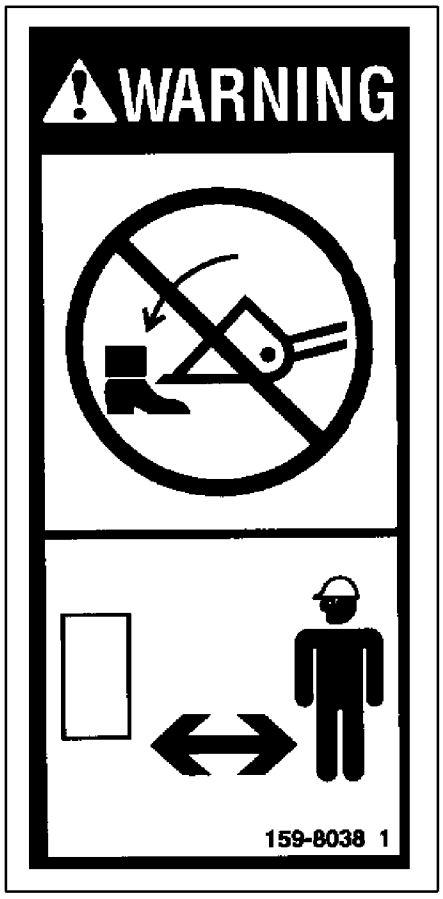
⚠ WARNING

Accumulator may contain high pressure oil. Do not service the accumulator or any hydraulic lines until all of the pressure has been relieved. See the Service Manual for proper procedures. Failure to heed this warning could result in injury or death.

Multipurpose Bucket

Illustration 21 g00592879

These warning labels are located on the front of the multipurpose bucket.



g00547368

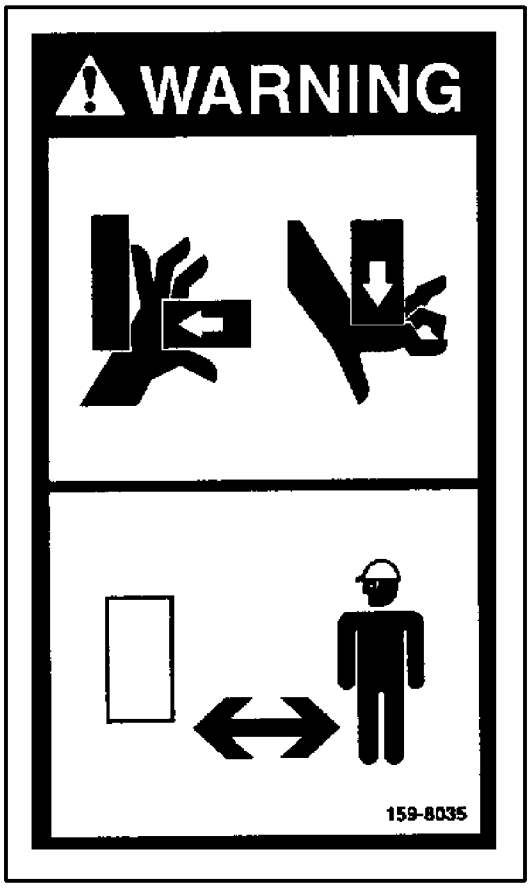
WARNING

No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.

Industrial Grapple Bucket

Illustration 22 g00592893

These warnings are located on top of the guards for the grapple cylinders.



g00544004

WARNING

No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.

Utility Grapple Bucket and Utility Grapple Fork

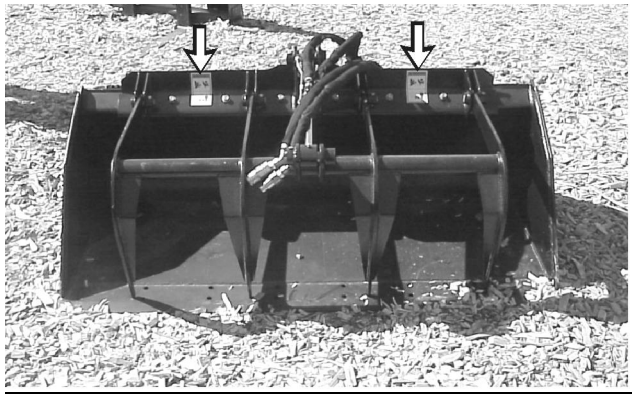
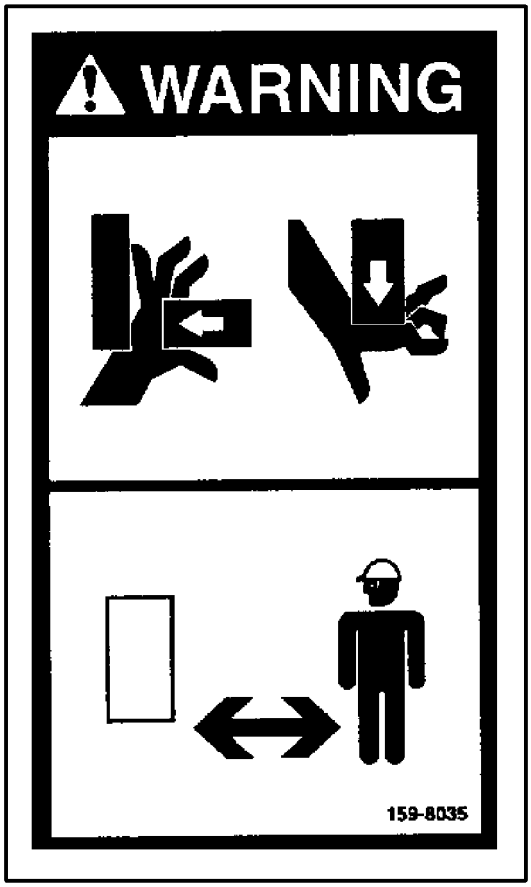


Illustration 23 g00647898

These warnings are located on top of the grapple frame.



g00544004

⚠ WARNING

No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.

Utility Fork

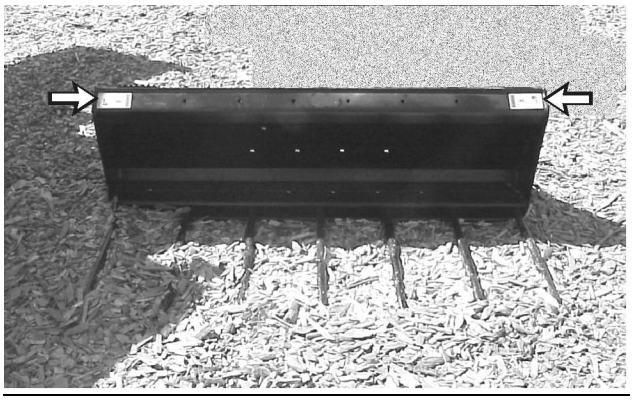
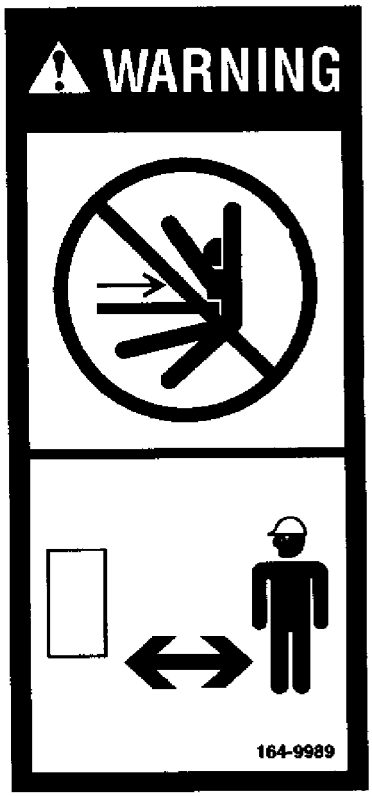


Illustration 24 g00647941

These warnings are located at the top of the fork carriage.



g00559260

⚠ WARNING

No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.

Industrial Grapple Fork

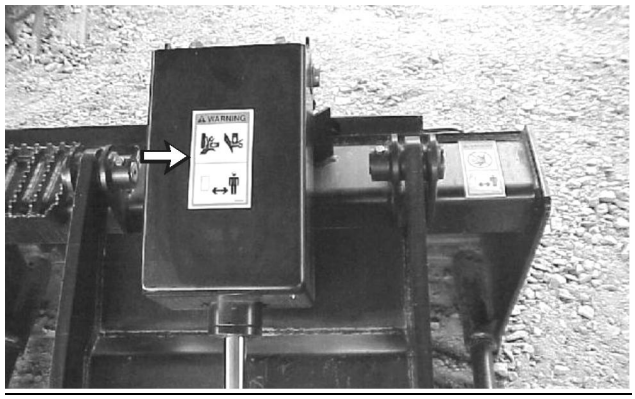
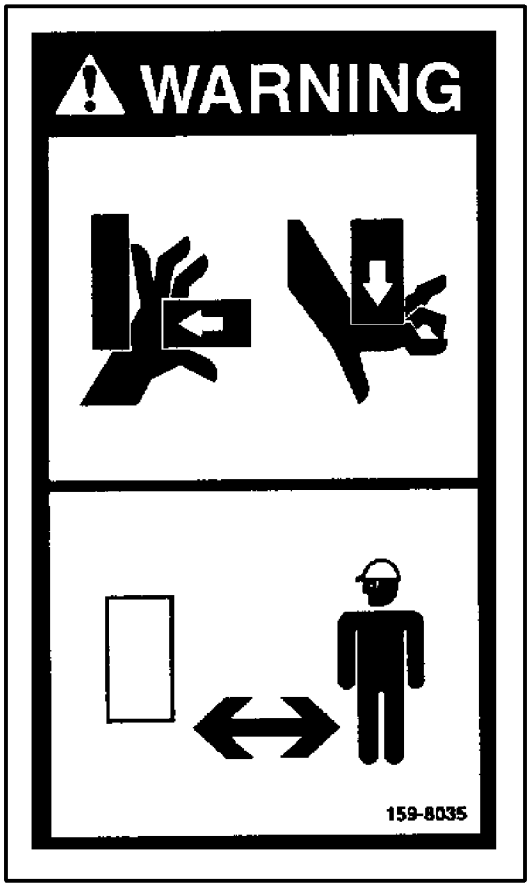


Illustration 25 g00653722

These warnings are located on the guards for grapple cylinders.



g00544004

WARNING

No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.

Utility Grapple Fork and Industrial Grapple Fork

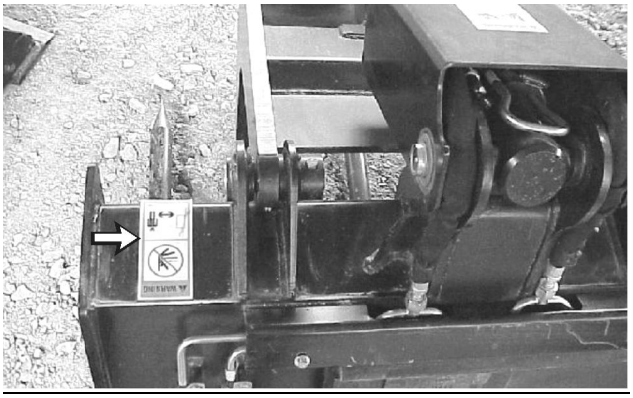
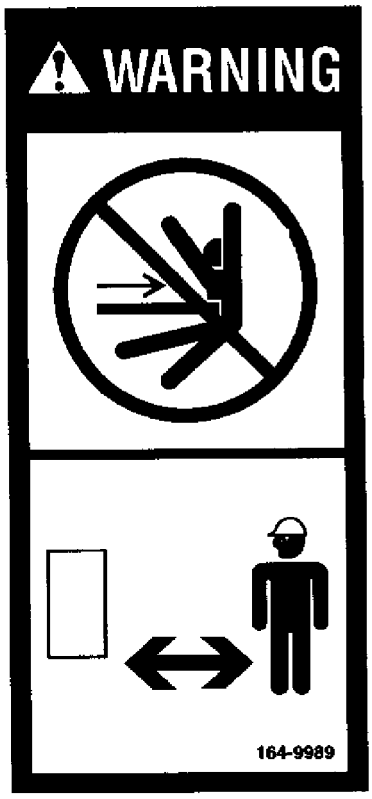


Illustration 26 g00653728

These warnings are located on the top of the fork assembly.



g00559260

⚠ WARNING

No clearance for person in this area during operation. Severe injury or death from impalement could occur. Stay away from the work tool while it is in operation.

Angle Blade

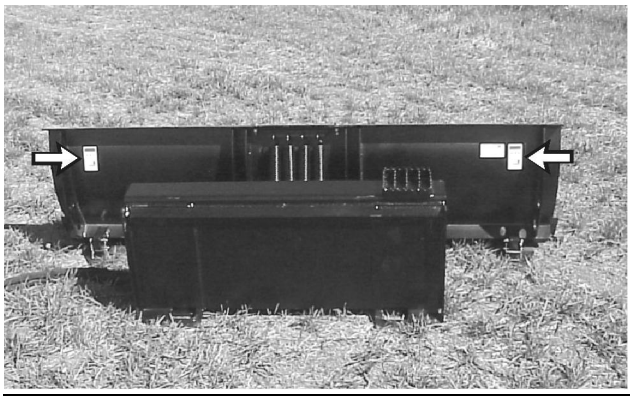
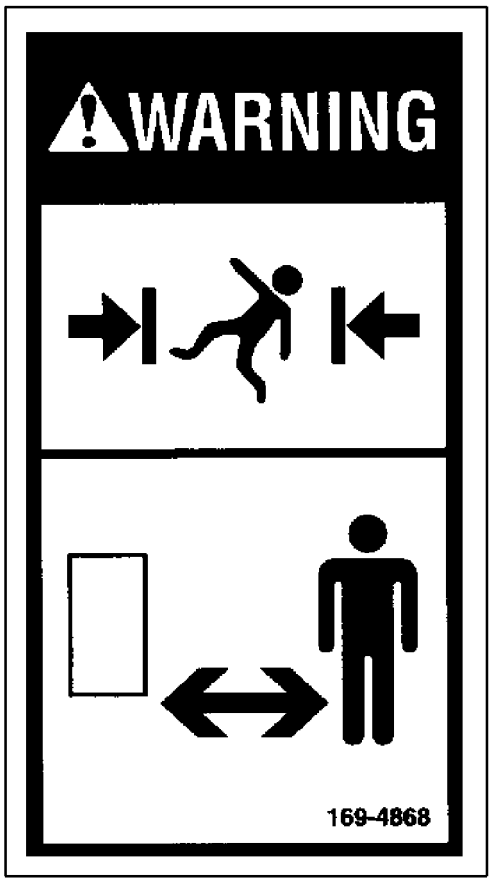


Illustration 27 g00643883

These warnings are located on the back side of the blade.



g00552954

⚠ WARNING

No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.

Dozer Blade

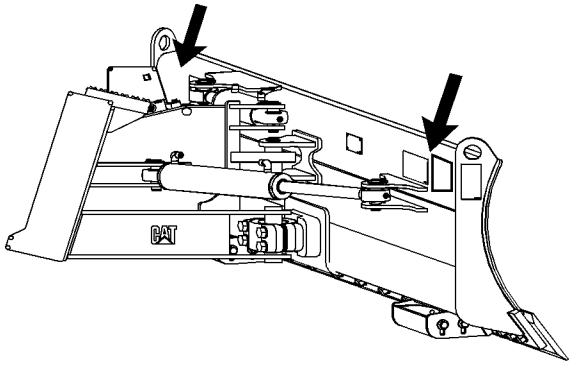
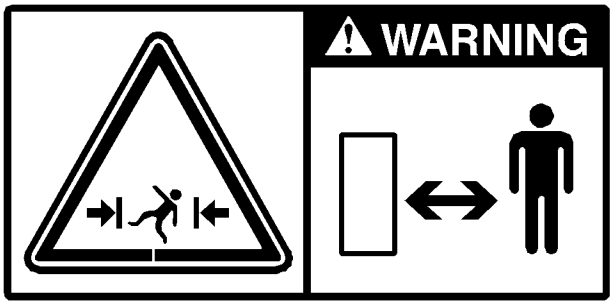


Illustration 28 g01067523

These warnings are located on the back side of the blade.



g01039066

WARNING

No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.

Dozer Blade

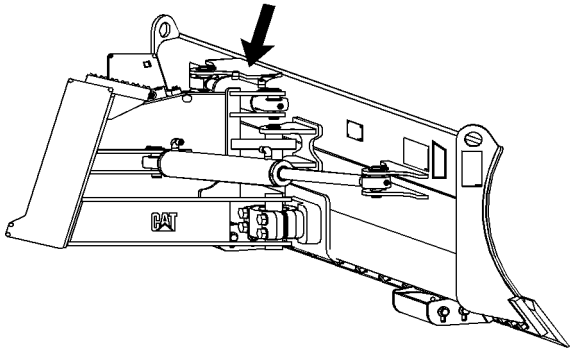
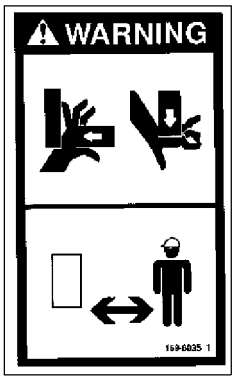


Illustration 29 g01079430

This warning is located on the top of the blade.



g00943180

WARNING

No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.

Dozer Blade

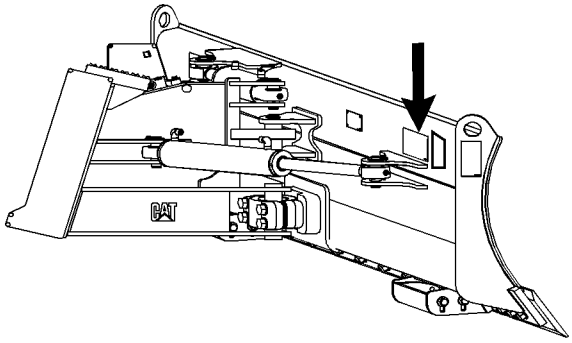
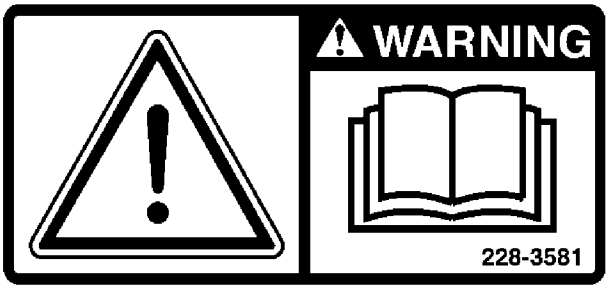


Illustration 30 g01079449

This warning is located on right hand side on the back of the blade.



g00934493

WARNING

DO NOT OPERATE OR WORK ON THIS MACHINE UNLESS YOU HAVE READ AND UNDERSTAND THE INSTRUCTIONS AND WARNINGS IN THE OPERATION AND MAINTENANCE MANUALS. FAILURE TO FOLLOW THE INSTRUCTIONS OR HEED THE WARNINGS COULD RESULT IN INJURY OR DEATH. CONTACT ANY CATERPILLAR DEALER FOR REPLACEMENT MANUALS. PROPER CARE IS YOUR RESPONSIBILITY.

Dozer Blade

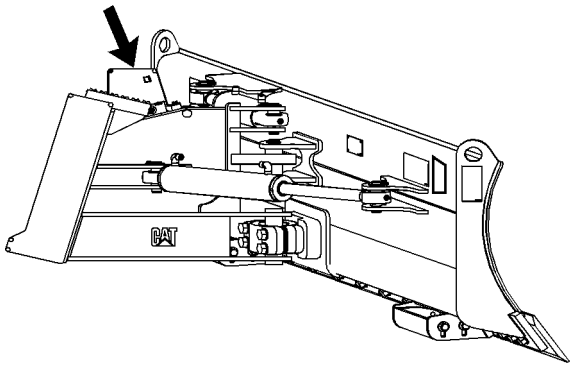


Illustration 31 g01079458

This warning message is located on top of the dozer blade.

g00946617

WARNING

Falling Hazard - Area may be oily and slippery. Do not step on cylinders. Serious injury or death could occur from a fall.

FOPS 2 (If Equipped)

Illustration 32 g00580442

This warning is located on the right side of the FOPS 2.

⚠ WARNING

Structural damage, an overturn, modification, alteration, or improper repair can impair this structure's protection capability thereby voiding this certification. Do not weld on or drill holes in the structure. Consult a Caterpillar dealer to determine this structure's limitations without voiding its certification.

This structure, when properly installed on a machine meets, at the time of installation, criteria established by: TOP GUARD: SAE J231, JAN 81, "ISO 3449 Level II".

Lifting and Tying Down (If Equipped)

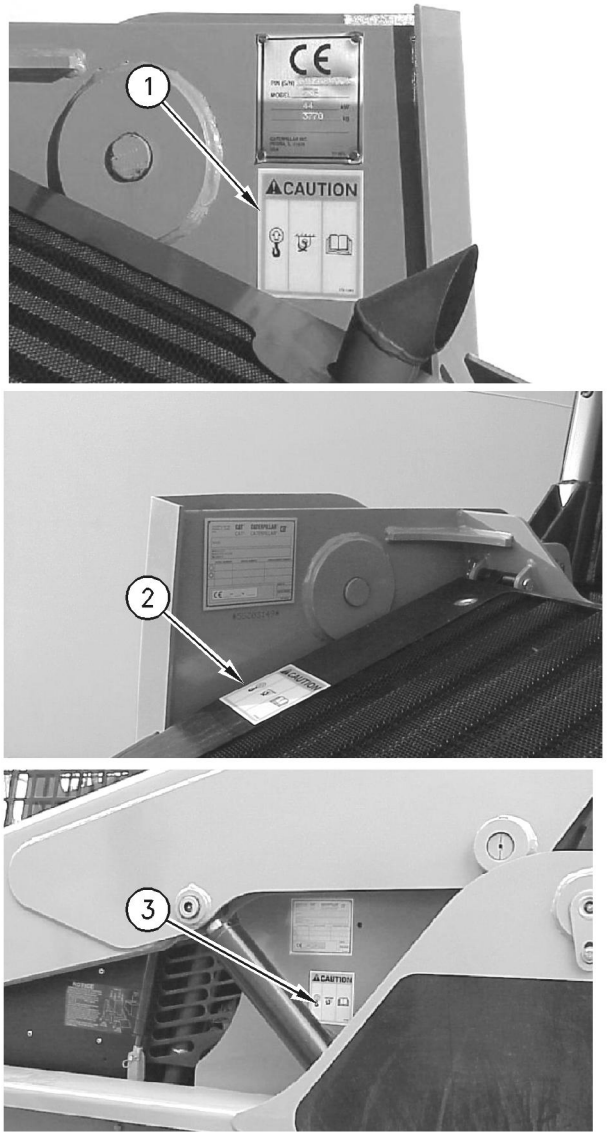


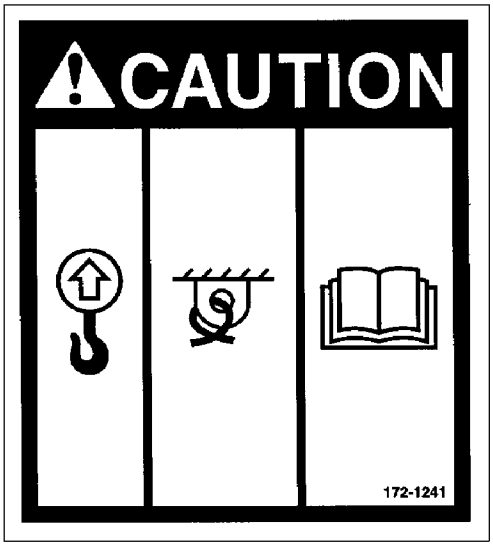
Illustration 33 g00821127

(1) standard lift (type 1)

(2) standard lift (type 2)

(3) extended lift (type 3)

This caution is required for machines that will be located in the European Union.



g00659168

⚠ CAUTION

Before lifting or tying down this machine, consult Operation and Maintenance Manual, "Transportation Information" for instructions and for calculation of machine mass. Do not use the mass that is stamped on the CE plate for lifting or tying down purposes. Failure to heed this caution could result in injury or property damage.

i02443908

General Hazard Information

SMCS Code: 7000

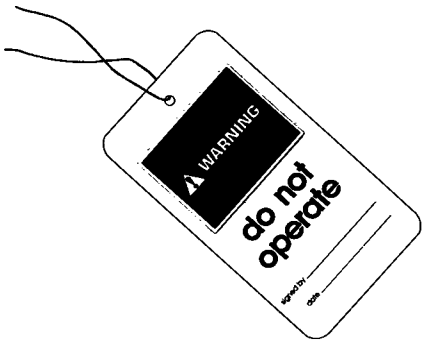


Illustration 34 g00104545

Attach a "Do Not Operate" warning tag or a similar warning tag to the start switch or to the controls before you service the equipment or before you repair the equipment. These warning tags (Special Instruction, SEHS7332) are available from your Caterpillar dealer.

Know the width of your equipment in order to maintain proper clearance when you operate the equipment near fences or near boundary obstacles.

Be aware of high voltage power lines and power cables that are buried. If the machine comes in contact with these hazards, serious injury or death may occur from electrocution.

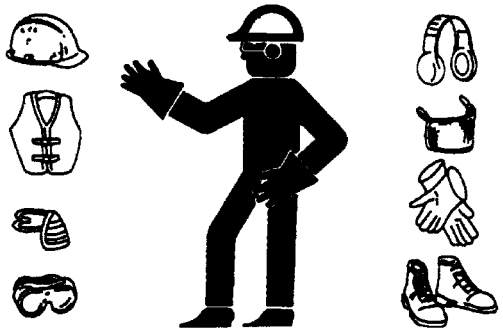


Illustration 35 g00702020

Wear a hard hat, protective glasses, and other protective equipment, as required.

Do not wear loose clothing or jewelry that can snag on controls or on other parts of the equipment.

Make sure that all protective guards and all covers are secured in place on the equipment.

Keep the equipment free from foreign material. Remove debris, oil, tools, and other items from the deck, from walkways, and from steps.

Secure all loose items such as lunch boxes, tools, and other items that are not a part of the equipment.

Know the appropriate work site hand signals and the personnel that are authorized to give the hand signals. Accept hand signals from one person only.

Do not smoke when you service an air conditioner. Also, do not smoke if refrigerant gas may be present. Inhaling the fumes that are released from a flame that contacts air conditioner refrigerant can cause bodily harm or death. Inhaling gas from air conditioner refrigerant through a lighted cigarette can cause bodily harm or death.

Never put maintenance fluids into glass containers. Drain all liquids into a suitable container.

Obey all local regulations for the disposal of liquids.

Use all cleaning solutions with care. Report all necessary repairs.

Do not allow unauthorized personnel on the equipment.

Unless you are instructed otherwise, perform maintenance with the equipment in the servicing position. Refer to Operation and Maintenance Manual for the procedure for placing the equipment in the servicing position.

Pressurized Air and Water

Pressurized air and/or water can cause debris and/or hot water to be blown out. This could result in personal injury.

When pressurized air and/or pressurized water is used for cleaning, wear protective clothing, protective shoes, and eye protection. Eye protection includes goggles or a protective face shield.

The maximum air pressure for cleaning purposes must be reduced to 205 kPa (30 psi) when the nozzle is deadheaded and the nozzle is used with an effective chip deflector and personal protective equipment. The maximum water pressure for cleaning purposes must be below 275 kPa (40 psi).

Trapped Pressure

Pressure can be trapped in a hydraulic system. Releasing trapped pressure can cause sudden machine movement or attachment movement. Use caution if you disconnect hydraulic lines or fittings. High pressure oil that is released can cause a hose to whip. High pressure oil that is released can cause oil to spray. Fluid penetration can cause serious injury and possible death.

Fluid Penetration

Pressure can be trapped in the hydraulic circuit long after the engine has been stopped. The pressure can cause hydraulic fluid or items such as pipe plugs to escape rapidly if the pressure is not relieved correctly.

Do not remove any hydraulic components or parts until pressure has been relieved or personal injury may occur. Do not disassemble any hydraulic components or parts until pressure has been relieved or personal injury may occur. Refer to the Service Manual for any procedures that are required to relieve the hydraulic pressure.

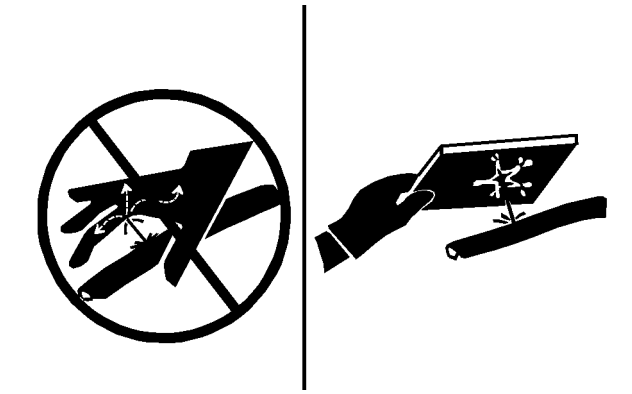


Illustration 36 g00687600

Always use a board or cardboard when you check for a leak. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

Containing Fluid Spillage

Care must be taken in order to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the equipment. Prepare to collect the fluid with suitable containers before opening any compartment or disassembling any component that contains fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for the following items:

- Tools that are suitable for collecting fluids and equipment that is suitable for collecting fluids
- Tools that are suitable for containing fluids and equipment that is suitable for containing fluids

Obey all local regulations for the disposal of liquids.

Asbestos Information

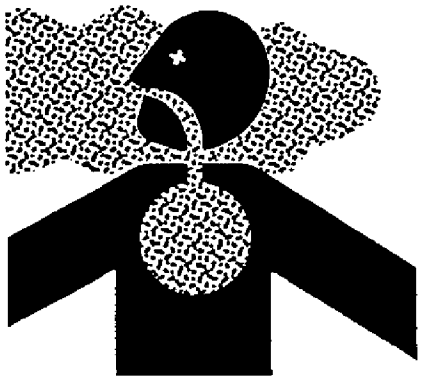


Illustration 37 g00702022

Caterpillar equipment and replacement parts that are shipped from Caterpillar are asbestos free. Caterpillar recommends the use of only genuine Caterpillar replacement parts. Use the following guidelines when you handle any replacement parts that contain asbestos or when you handle asbestos debris.

Use caution. Avoid inhaling dust that might be generated when you handle components that contain asbestos fibers. Inhaling this dust can be hazardous to your health. The components that may contain asbestos fibers are brake pads, brake bands, lining material, clutch plates, and some gaskets. The asbestos that is used in these components is usually bound in a resin or sealed in some way. Normal handling is not hazardous unless airborne dust that contains asbestos is generated.

If dust that may contain asbestos is present, there are several guidelines that should be followed:

- Never use compressed air for cleaning.
- Avoid brushing materials that contain asbestos.
- Avoid grinding materials that contain asbestos.
- Use a wet method in order to clean up asbestos materials.
- A vacuum cleaner that is equipped with a high efficiency particulate air filter (HEPA) can also be used.
- Use exhaust ventilation on permanent machining jobs.
- Wear an approved respirator if there is no other way to control the dust.
- Comply with applicable rules and regulations for the work place. In the United States, use Occupational Safety and Health Administration (OSHA) requirements. These OSHA requirements can be found in “29 CFR 1910.1001”.
- Obey environmental regulations for the disposal of asbestos.
- Stay away from areas that might have asbestos particles in the air.

Dispose of Waste Properly

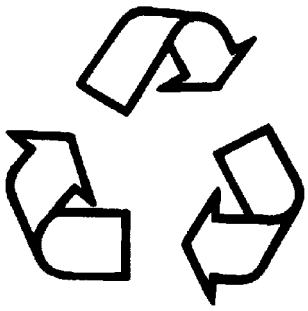


Illustration 38 g00706404

Improperly disposing of waste can threaten the environment. Potentially harmful fluids should be disposed of according to local regulations.

Always use leakproof containers when you drain fluids. Do not pour waste onto the ground, down a drain, or into any source of water.

i01359664

Crushing Prevention and Cutting Prevention

SMCS Code: 7000

Support the equipment properly before you perform any work or maintenance beneath that equipment. Do not depend on the hydraulic cylinders to hold up the equipment. Equipment can fall if a control is moved, or if a hydraulic line breaks.

Do not work beneath the cab of the machine unless the cab is properly supported.

Unless you are instructed otherwise, never attempt adjustments while the machine is moving or while the engine is running.

Never jump across the starter solenoid terminals in order to start the engine. Unexpected machine movement could result.

Whenever there are equipment control linkages the clearance in the linkage area will change with the movement of the equipment or the machine. Stay clear of areas that may have a sudden change in clearance with machine movement or equipment movement.

Stay clear of all rotating and moving parts.

If it is necessary to remove guards in order to perform maintenance, always install the guards after the maintenance is performed.

Keep objects away from moving fan blades. The fan blade will throw objects or cut objects.

Do not use a kinked wire cable or a frayed wire cable. Wear gloves when you handle wire cable.

When you strike a retainer pin with force, the retainer pin can fly out. The loose retainer pin can injure personnel. Make sure that the area is clear of people when you strike a retainer pin. To avoid injury to your eyes, wear protective glasses when you strike a retainer pin.

Chips or other debris can fly off an object when you strike the object. Make sure that no one can be injured by flying debris before striking any object.

i01329099

Burn Prevention

SMCS Code: 7000

Do not touch any part of an operating engine. Allow the engine to cool before any maintenance is performed on the engine. Relieve all pressure in the air system, in the oil system, in the lubrication system, in the fuel system, or in the cooling system before any lines, fittings or related items are disconnected.

Coolant

When the engine is at operating temperature, the engine coolant is hot. The coolant is also under pressure. The radiator and all lines to the heaters or to the engine contain hot coolant.

Any contact with hot coolant or with steam can cause severe burns. Allow cooling system components to cool before the cooling system is drained.

Check the coolant level only after the engine has been stopped.

Ensure that the filler cap is cool before removing the filler cap. The filler cap must be cool enough to touch with a bare hand. Remove the filler cap slowly in order to relieve pressure.

Cooling system conditioner contains alkali. Alkali can cause personal injury. Do not allow alkali to contact the skin, the eyes, or the mouth.

Oils

Hot oil and hot components can cause personal injury. Do not allow hot oil to contact the skin. Also, do not allow hot components to contact the skin.

Remove the hydraulic tank filler cap only after the engine has been stopped. The filler cap must be cool enough to touch with a bare hand. Follow the standard procedure in this manual in order to remove the hydraulic tank filler cap.

Batteries

Electrolyte is an acid. Electrolyte can cause personal injury. Do not allow electrolyte to contact the skin or the eyes. Always wear protective glasses for servicing batteries. Wash hands after touching the batteries and connectors. Use of gloves is recommended.

i01359795

Fire Prevention and Explosion Prevention

SMCS Code: 7000

Illustration 39 g00704000

All fuels, most lubricants, and some coolant mixtures are flammable.

Flammable fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire. Fire may cause personal injury and property damage.

Remove all flammable materials such as fuel, oil, and debris from the machine. Do not allow any flammable materials to accumulate on the machine.

Store fuels and lubricants in properly marked containers away from unauthorized persons. Store oily rags and any flammable materials in protective containers. Do not smoke in areas that are used for storing flammable materials.

Do not operate the machine near any flame.

Exhaust shields (if equipped) protect hot exhaust components from oil spray or fuel spray in case of a break in a line, in a hose, or in a seal. Exhaust shields must be installed correctly.

Do not weld on lines or on tanks that contain flammable fluids. Do not flame cut lines or tanks that contain flammable fluid. Clean any such lines or tanks thoroughly with a nonflammable solvent prior to welding or flame cutting.

Check all electrical wires daily. Repair any wires that are loose or frayed before you operate the machine. Clean all electrical connections and tighten all electrical connections.

Dust that is generated from repairing nonmetallic hoods or nonmetallic fenders can be flammable and/or explosive. Repair such components in a well ventilated area away from open flames or sparks.

Inspect all lines and hoses for wear or for deterioration. The hoses must be properly routed. The lines and the hoses must have adequate support and secure clamps. Tighten all connections to the recommended torque. Leaks can cause fires.

Illustration 40 g00704059

Use caution when you are refueling a machine. Do not smoke while you are refueling a machine. Do not refuel a machine near open flames or sparks. Always stop the engine before refueling. Fill the fuel tank outdoors.

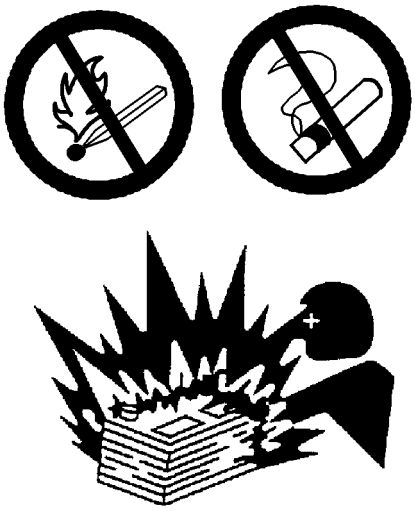


Illustration 41 g00704135

Gases from a battery can explode. Keep any open flames or sparks away from the top of a battery. Do not smoke in battery charging areas.

Never check the battery charge by placing a metal object across the terminal posts. Use a voltmeter or a hydrometer.

Improper jumper cable connections can cause an explosion that can result in injury. Refer to the Operation Section of this manual for specific instructions.

Do not charge a frozen battery. This may cause an explosion.

Fire Extinguisher

Make sure that a fire extinguisher is available. Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instruction plate.

Ether

Ether is flammable and poisonous.

Use ether in well ventilated areas. Do not smoke while you are replacing an ether cylinder or while you are using an ether spray.

Do not store ether cylinders in living areas or in the operator compartment of a machine. Do not store ether cylinders in direct sunlight or in temperatures above 49 °C (120 °F). Keep ether cylinders away from open flames or sparks.

Dispose of used ether cylinders properly. Do not puncture an ether cylinder. Keep ether cylinders away from unauthorized personnel.

Do not spray ether into an engine if the machine is equipped with a thermal starting aid for cold weather starting.

Lines, Tubes and Hoses

Do not bend high pressure lines. Do not strike high pressure lines. Do not install any lines that are bent or damaged.

Repair any lines that are loose or damaged. Leaks can cause fires. Consult your Caterpillar dealer for repair or for replacement parts.

Check lines, tubes and hoses carefully. Do not use your bare hand to check for leaks. Use a board or cardboard to check for leaks. Tighten all connections to the recommended torque.

Replace the parts if any of the following conditions are present:

- End fittings are damaged or leaking.
- Outer coverings are chafed or cut.
- Wires are exposed.
- Outer coverings are ballooning.
- Flexible part of the hoses are kinked.
- Outer covers have embedded armoring.
- End fittings are displaced.

Make sure that all clamps, guards, and heat shields are installed correctly. During machine operation, this will help to prevent vibration, rubbing against other parts, and excessive heat.

i01820946

Fire Extinguisher Location

SMCS Code: 7000; 7419

Make sure that a fire extinguisher is on the machine. Make sure that you are familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher. Obey the recommendations on the instruction plate.

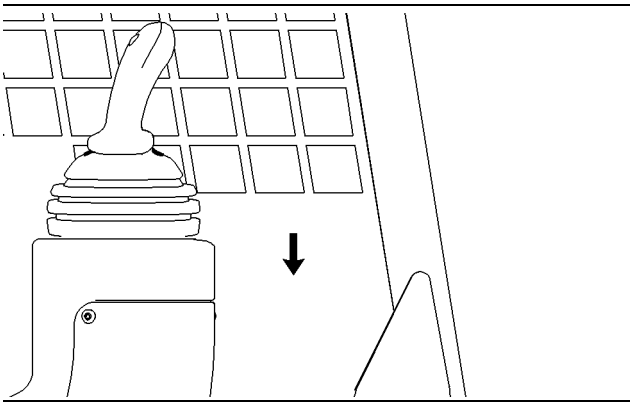


Illustration 42 g00929625

Mount the fire extinguisher on the left side of the cab floor in front of the console for the speed/direction control. Consult your Caterpillar dealer for the proper procedure for mounting the fire extinguisher.

i01122596

Electrical Storm Injury Prevention

SMCS Code: 7000

When lightning is striking in the vicinity of the machine, the operator should never attempt the following procedures:

- Mount the machine.
- Dismount the machine.

If you are in the operator’s station during an electrical storm, stay in the operator’s station. If you are on the ground during an electrical storm, stay away from the vicinity of the machine.

i00771840

Before Starting Engine

SMCS Code: 1000; 7000

Start the engine only from the operator compartment. Never short across the starter terminals or across the batteries. Shorting could damage the electrical system by bypassing the engine neutral start system.

Inspect the condition of the seat belt and of the mounting hardware. Replace any parts that are worn or damaged. Regardless of appearance, replace the seat belt after three years of use. Do not use a seat belt extension on a retractable seat belt.

Adjust the seat so that full pedal travel can be achieved with the operator's back against the back of the seat.

Make sure that the machine is equipped with a lighting system that is adequate for the job conditions. Make sure that all machine lights are working properly.

Before you start the engine and before you move the machine, make sure that no one is underneath the machine, around the machine, or on the machine. Make sure that the area is free of personnel.

i01027818

Engine Starting

SMCS Code: 1000; 7000

If a warning tag is attached to the start switch or to the controls, do not start the engine. Also, do not move any controls.

Move all hydraulic controls to the HOLD position before you start the engine.

Diesel engine exhaust contains products of combustion which can be harmful to your health. Always start the engine in a well ventilated area. Always operate the engine in a well ventilated area. If you are in an enclosed area, vent the exhaust to the outside.

i01545253

Before Operation

SMCS Code: 7000

A video tape is available in English in North American format for the machine. Contact your Caterpillar dealer in order to obtain a copy of Skid Steer Safety and Operating Tips, AEVN4482. The video tape should be viewed by every person that operates the machine.

Clear all personnel from the machine and from the area.

Clear all obstacles from the path of the machine. Beware of hazards such as wires, ditches, etc.

Make sure that all windows are clean. Secure all doors in the closed position. Secure the windows in the open position or in the shut position.

Make sure that the machine horn (if equipped), the backup alarm (if equipped) and all other warning devices are working properly.

Fasten the seat belt securely. Lower the armrest.

i01406248

Operation

SMCS Code: 7000

Only operate the machine while you are in the seat. The seat belt must be fastened while you operate the machine. Only operate the controls while the engine is running.

Before you move the machine, you must be certain that no one will be endangered.

While you operate the machine and the work tool slowly in an open area, check for proper operation of all controls and all protective devices.

Do not allow riders on the machine.

Note any needed repairs during machine operation. Report any needed repairs.

Use only Caterpillar Approved Work Tools on this machine. Obey all the lift restrictions. Refer to Operation and Maintenance Manual, "Caterpillar Approved Work Tools" for the approved work tools and the lift restriction information.

Carry work tools low. Lower the lift arms fully. Tilt back the work tool in order to keep the work tool off of the ground. Do not go close to the edge of a cliff, an excavation, or an overhang.

If the machine begins to sideslip downward on a grade, immediately remove the load and turn the machine downhill.

Avoid any conditions that can lead to tipping the machine. The machine can tip when you work on hills, on banks and on slopes. Also, the machine can tip when you cross ditches, ridges or other unexpected obstacles.

Avoid operating the machine across the slope. When possible, operate the machine up the slopes and down the slopes.

Maintain control of the machine. Do not overload the machine beyond the machine capacity.

Never straddle a wire cable. Never allow personnel to straddle a wire cable.

Know the maximum dimensions of your machine.

Always keep the Rollover Protective Structure (ROPS) installed during machine operation.

This machine is designed to operate in the ambient temperature range of −32 °C (−25 °F) to 43 °C (109.4 °F).

Observe any local government regulations when you use the Skid Steer Loader to lift heavy objects.

i01115299

Work Tools

SMCS Code: 6700

Only use work tools that are approved by Caterpillar for use on Caterpillar machines. Refer to the Operation and Maintenance Manual, “Caterpillar Approved Work Tools”.

If you are in doubt about the compatibility of a particular work tool with your machine, consult your Caterpillar dealer.

Make sure that all necessary guarding is in place on the host machine and on the work tool.

Keep all windows and doors closed on the host machine. Always wear protective glasses. Always wear the protective equipment that is recommended in the work tool’s operation manual. Wear any other protective equipment that is required for the operating environment.

To prevent personnel from being struck by flying objects, ensure that all personnel are out of the work area.

While you are performing any maintenance, any testing, or any adjustments to the work tool stay clear of the following areas: cutting edges, pinching surfaces, and crushing surfaces.

i01487624

Parking

SMCS Code: 7000

Park on a level surface. If you must park on a grade, chock the machine.

1. Move the speed/direction control lever slowly to the HOLD position in order to stop the machine.
2. Move the governor control lever to the LOW IDLE position.
3. Lower the loader arms and tilt the linkage so that the work tool rests firmly on the ground.
4. Stop the engine. Keep the armrest in the LOWERED position.
5. Turn the engine start switch key to the ON position. Push the parking brake switch.
6. Move all hydraulic control levers while you are pressing several times on each side of the auxiliary hydraulic control (if equipped) and the high flow control (if equipped) in order to relieve hydraulic pressure.
7. Move the hydraulic control levers to the HOLD position.
8. Turn the engine start switch key to OFF position and remove the key.

i01329161

Equipment Lowering with Engine Stopped

SMCS Code: 7000

Before lowering any equipment with the engine stopped, clear the area around the equipment of all personnel. The procedure to use will vary with the type of equipment to be lowered. Keep in mind most systems use a high pressure fluid or air to raise or lower equipment. The procedure will cause high pressure air, hydraulic, or some other media to be released in order to lower the equipment. Wear appropriate personal protective equipment and follow the established procedure in the Operation and Maintenance Manual, “Equipment Lowering with Engine Stopped” in the Operation Section of the manual.

i01724560

Sound Information and Vibration Information

SMCS Code: 7000

Sound Performance for Machines that are Offered in European Union Countries and in Countries that Adopt the EU Directives

The operator sound pressure levels are measured according to dynamic test procedures and conditions that are specified in “ISO 6396”.

Hearing protection may be required when operating with an open operator station and cab (when not properly maintained or doors/windows open) for extended periods or in a noisy environment.

As manufactured by Caterpillar, this machine’s exterior sound power level meets the criteria specified in the European Directives noted on the Certificate of Conformance and the accompanying label.

The labeled interior sound power lever is 89 dB(A). The labeled exterior sound power level is 104 dB(A) measured according to the test procedures and conditions specified in “2000/14/EC”.

Machine Vibration Levels

The hands and arms are subjected to a weighted root mean square acceleration that is 2.5 m/s^2 (8.2 ft/s^2).

The whole body is subjected to a weighted root mean square acceleration that is 0.7 m/s^2 (2.3 ft/s^2).

The measurements are obtained on a representative machine by using the procedures that are in the following standards:

- “ISO 2631/1”
- “ISO 5349”
- “SAE J1166”

i01992325

Guards (Operator Protection)

SMCS Code: 7150-MCH; 7325

There are different types of guards that are used to protect the operator. The machine and the machine application determines the type of guard that should be used.

A daily inspection of the guards is required in order to check for structures that are bent, cracked or loose. Never operate a machine with a damaged structure.

The operator becomes exposed to a hazardous situation if the machine is used improperly or if poor operating techniques are used. This situation can occur even though a machine is equipped with an appropriate protective guard. Follow the established operating procedures that are recommended for your machine.

Rollover Protective Structure (ROPS), Falling Object Protective Structure (FOPS) or Tip Over Protection Structure (TOPS)

The ROPS/FOPS Structure (if equipped) on your machine is specifically designed, tested and certified for that machine. Excavators are not equipped with ROPS structures. Any alteration or any modification to the ROPS/FOPS Structure could weaken the structure. This places the operator into an unprotected environment. Modifications or attachments that cause the machine to exceed the weight that is stamped on the certification plate also place the operator into an unprotected environment. Excessive weight may inhibit the brake performance, the steering performance and the ROPS. The protection that is offered by the ROPS/FOPS Structure will be impaired if the ROPS/FOPS Structure has structural damage. Damage to the structure can be caused by an overturn, a falling object, a collision, etc.

Do not mount items (fire extinguishers, first aid kits, work lights, etc) by welding brackets to the ROPS/FOPS Structure or by drilling holes in the ROPS/FOPS Structure. Welding brackets or drilling holes in the ROPS/FOPS Structures can weaken the structures. Consult your Caterpillar dealer for mounting guidelines.

The Tip Over Protection Structure (TOPS) is another type of guard that is used on mini hydraulic excavators. This structure protects the operator in the event of a tipover. The same guidelines for the inspection, the maintenance and the modification of the ROPS/FOPS Structure are required for the Tip Over Protection Structure.

Other Guards (If Equipped)

Protection from flying objects and/or falling objects is required for special applications. Logging applications and demolition applications are two examples that require special protection.

A front guard needs to be installed when a work tool that creates flying objects is used. Mesh front guards that are approved by Caterpillar or polycarbonate front guards that are approved by Caterpillar are available for machines with a cab or an open canopy. On machines that are equipped with cabs, the windshield should also be closed. Safety glasses are recommended when flying hazards exist for machines with cabs and machines with open canopies.

If the work material extends above the cab, top guards and front guards should be used. Typical examples of this type of application are listed below:

- Demolition applications
- Rock quarries
- Forestry products

Additional guards may be required for specific applications or work tools. The Operation and Maintenance Manual for your machine or your work tool will provide specific requirements for the guards. Consult your Caterpillar dealer for additional information.